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PROVIDING A SERVICE IN A COMMUNICATION SYSTEMField of the Invention

5 The present invention relates to a method of providing a service in a communication system, wherein the service is provided by a content provider to a user. The present invention also relates to an apparatus for providing a service in a communication system, wherein the service is provided by a content provider to a user. The invention is applicable to but  
10 not limited to a cellular radio communication system such as the Universal Mobile Telecommunication System (UMTS) currently under standardisation.

Background of the Invention

15 Diverse information services currently exist. The content of such information services are typically provided by a content provider, and transmitted to end users by means of some communication network. The communication network is often termed an information highway, and can  
20 be for example the internet or other electronic communications routes. Some examples of the type of information provided are news bulletins, travel routes, tourist advice, and so on. The content of such information services are often produced and transmitted in multimedia form.

25 Information highways or networks such as the internet consist of many sub-links connected in a nodal fashion, and the sub-links are formed of different specific types of communications link, for example digital telephone lines, ISDN lines and analogue telephone lines.

30 One type of communication link that is expected in future to play an increasing role as one link within information highways such as the internet is that provided by cellular radio communication systems, in particular in the case where the user or subscriber station is a mobile one. Presently established cellular radio communication systems include GSM  
35 systems (Global System for Mobile Communications).

The Universal Mobile Telecommunication System (UMTS) currently under standardisation is intended to provide a harmonised standard under which cellular radio communication systems will provide  
5 communications links suitable for transmitting a variety of data services such as information services as described above. It is expected that within the framework of developments such as UMTS or the like, cellular radio communication systems will play an increasing role in information highways such as the internet.

10 Generally speaking, the above described combination of information provision services and cellular radio communications systems along the lines of UMTS creates a broad range of new engineering problems and challenges. Indeed, one of the challenges faced is to envisage what new  
15 opportunities arise to provide users with additional facilities in the light of such a combination.

### Summary of the Invention

20 In the light of the above the present inventors have envisaged that the information services to be handled by systems such as UMTS, especially when in multimedia form, will be extremely diverse and each will have very different requirements with respect to communications parameters  
25 such as bandwidth, delay, and error rate. Similarly the present inventors have envisaged that different users will have different types of user station with differing capabilities. The present inventors have envisaged that some content providers will be able to offer users, i.e. customers, a choice as to what overall quality they wish to receive the information at, in terms of for  
30 example bandwidth, delay, and error rate, as a function of the price the customer wishes to pay.

The present inventors have further envisaged that since for some classes of information, e.g. news bulletins, there could be several sources of the same or similar information, the user could go to alternative content providers who could charge differently. Similarly, the present inventors have  
5 envisaged that cellular communication systems such as UMTS will involve respective arrangements of networks and sub-networks other than the simple linear arrangement of present systems such as GSM. In particular some networks will operate as access networks and others as core networks. Furthermore, the present inventors have envisaged that  
10 content providers will potentially be able to input their information at more than one input interface location of the respective network or interconnected networks.

The present inventors have also envisaged that within systems such as  
15 UMTS there will consequently be many routes to connect desired services. Depending on the bandwidths available, facilities, transmission distances and so on, the different cellular radio system network operators' costs will vary and hence the price to the user. The present inventors have envisaged therefore that overall there will be many combinations of content provider,  
20 networks, communications parameters and hence price.

The present invention advantageously implements means for the content provider and end user to take advantage of the characteristics described above and envisaged by the present inventors.

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According to one aspect of the present invention, there is provided a method of providing a service in a communication system, wherein the service is provided by a content provider to a user, as claimed in claim 1.

30 According to another aspect of the invention, there is provided an apparatus for providing a service in a communication system, wherein the service is provided by a content provider to a user, as claimed in claim

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Further aspects of the invention are as claimed in the dependent claims.

- 5 The present invention provides the user with communication parameter options, which enable the user to select the level of service required as a function of price. Having made a selection, the user can advantageously be provided with a sample service corresponding to the selection for a limited duration. Additional specific advantages are apparent from the following description and figures.
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### Brief Description of the Drawings

FIG. 1 is an illustration of a communication system in accordance with the present invention.

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FIG. 2 is a schematic illustration of options provided in a preferred embodiment of the present invention.

FIG. 3 is a schematic illustration of a user station including an external device according to an embodiment of the present invention.

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### Description of a Preferred Embodiment of the Invention

One particular embodiment of the invention is now described by way of example only. FIG. 1 shows a communication system 100 including a user station 110 and a control station 120. In this example, user station 110 is a mobile station and control station 120 consists of a base station system (BSS). A communication link established between BSS 120 and mobile station 110 is achieved by a radio link 130. The geographical area served by BSS 120 constitutes one cell of a cellular radio communication system.

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In the present embodiment BSS 120 is connected to a mobile services switching centre (MSC) 140, which in turn is connected to a public

switched telephone network (PSTN) 150. In the present embodiment PSTN 150 is connected to an information network 160, which in the present example consists of the internet. The present invention is however also applicable to other information networks, including restricted access  
5 networks and private networks.

In the present embodiment the content provider will provide an information service to a user via the route consisting of information network 160, PSTN 150, MSC 140, control station 120, radio link 130 and  
10 mobile station 110. The information, in multimedia form, is input to the information network via an interface 170. In the present example this interface consists of a modem and the content provider has produced the information content on a computer system.

15 In other embodiments interface 170 could be coupled directly to PSTN 150 or MSC 140. One scenario in which direct coupling into MSC 140 could occur would be when a particular content provider has a commercial agreement with a particular cellular radio communication network operator having control of or access to MSC 140.

20 Furthermore it is to be appreciated that the present invention is applicable to other varieties of network configurations and network components, arranged in different hierarchical, access and interconnection formats, in data handling communications systems such as UMTS. As such, the  
25 route via which the content provider will provide an information service to a user in other embodiments of the present invention will be chosen by the skilled person according to the particular characteristics of each overall network arrangement, and similarly the location of interface 170 will be chosen according to the particular characteristics of the overall network  
30 arrangement and the nature of the network components.

Similarly, it is to be appreciated that according to the specific network

configuration and hierarchies, alternative system components will be incorporated serving different roles compared to control station 120, MSC 140 and PSTN 150. For example, networks such as UMTS ones may incorporate a public data network as opposed to a PSTN, and may  
5 incorporate a mobile packet switch as opposed to an MSC. Indeed the invention is applicable to any communication network, including overall networks consisting of sub-networks arranged in parallel and/or superimposed hierarchical logical format, in which a content provider is somewhere inputting an information service into the network  
10 arrangement and somewhere else in the overall network arrangement is located a user station by which a user is receiving or intending to receive the information service.

The method of the present embodiment includes the step of providing to  
15 the user a plurality of options related to values of at least one communications parameter to be used during the provision of service, for selection therefrom by the user.

In the present embodiment four communications parameters are  
20 included, namely  
a) bandwidth,  
b) delay,  
c) error rate, and  
d) communications route.

25 In the present embodiment each of these communications parameters, shown as items 210, 220, 230 and 240 in FIG. 2, are presented to the user on the display of the mobile station. Each of these communications parameters will have an effect on the quality of the service as perceived by the user. It is to be appreciated that the present invention applies to other  
30 embodiments in the form of other communications parameters which will have an effect on the quality of service as perceived by the user.

In the present embodiment, the user station comprises a mobile telephone 310 comprising means for communicating over a communication link 320 with an external device 330, as shown in FIG. 3. The external device can in principle be any device not an integral part of the mobile station, but is preferably a computer or an electronic organiser. Alternatively, the external device can be a smartcard, such as the Subscriber Identity Module (SIM) card used in cellular radio communications systems. The communication link 320 is preferably a fixed cable connection with appropriate interfaces built into the mobile station and the external device, but other communication links such as infrared or radio links can be used.

With respect to each of the above mentioned communications parameters a plurality of options related to the values thereof to be used during the provision of service, shown in FIG. 2 as items 212, 214 and 216 for bandwidth, items 222, 224 and 226 for delay, items 232, 234 and 236 for error rate, and items 242, 244 and 246 for communications route, are provided to the user, on the display of the mobile station. The options are presented in the present example to the user in the form of the readily appreciated terminology. In the case of bandwidth, the terms are "slow", "medium" and "fast", corresponding to the values 9.6kB, 200kB and 2Mb respectively. In the case of delay, the terms are "audio", "up to 30 seconds" and "up to 2 hours", where audio corresponds to 50 microseconds. In the case of error rate, the terms are "poor quality", "medium quality" and "high quality", corresponding to the values  $10^{-4}$ ,  $10^{-8}$  and  $10^{-12}$  respectively. In the case of communications route, the identity of different available communications networks are provided, in this example network X, network Y and network Z. It will be readily appreciated that presenting the options to the user in terms of everyday terminology provides benefits related to user friendliness, but it is noted that the relevant options could alternatively be presented in the form of the actual numerical values where appropriate, or in terms of both the user friendly terms and the real numerical values. It will also be appreciated that although the present example specifically

cites three options for each parameter, in other examples any discrete number from 2 upward would be possible, moreover the number of options can be different for different respective parameters. Yet further, the plurality of options could be embodied in the form of a continuous range of values which would preferably be presented to the user in the form of slider bars.

The user selects the required options by use of conventional keyboard/screen interface means, for example by directing movement of a cursor by keyboard keys or mouse operation, and clicking, and so on.

In the present embodiment, a further feature can be that the options are provided as a function of price. The way in which the price function will be presented to the user will be chosen according to the particular situation under consideration. In the present example, a total price is provided, as shown at item 210 in FIG. 2. The price displayed initially is that corresponding to default options, the identity of which will be shown on the display by highlighting means. As the user selects particular alternative options, the price will adjust accordingly. How this is achieved is now explained.

In the present embodiment the function of price is determined using price information input by the content provider and/or price information input by one or more further service providers forming a communications route between the content provider and the user. Thus in the present example price information forming part of the overall price function will have been derived from the operator of PSTN 150, and from the operator of the cellular radio communication system comprising MSC 140 and control station 120, and this price information will have been transmitted to the content provider who will have chosen his own prices as a function of bandwidth, error rate etc., in the light of the provided for such options by the respective operators.



One possibility is that the function of price is determined using stored price information data obtained from an earlier provision of service employing the corresponding values of said at least one communications parameter.

- 5 In other words the content provider will have produced price functions based on earlier actual prices that resulted for equivalent choices of options.

- 10 An alternative possibility is that the function of price is determined in real-time using currently applicable price information. Under this possibility the above mentioned operators as well as the content provider will each be providing ongoing input of price variables which are called upon as the user selects different options. Such a process is implemented by a pricing structure. Such a structure can be based on a packet billing system, which
- 15 takes into account the demanded bandwidth, quality and delay, through which a test packet is sent through the network in order to determine the price which is assigned to it.

- In the present embodiment, a further feature can be that simulation
- 20 means are provided by the content provider for use by the user to carry out simulation of the service that would be provided according to an intended selection by the user. The availability of the simulation means is indicated to the user in association with provision of the plurality of options by means of an item on the display of the user station, such as shown as item 260 in
- 25 FIG. 2. One possibility is that the user can acquire said simulation means via the communication system, in that software forming the simulation means is provided by the content provider for downloading by the user into his mobile station. An alternative would be that software forming the simulation means was pre-loaded onto the user's mobile station, or
- 30 available for use in the mobile station by some other means.

The user implements use of the simulation means by further use of conventional keyboard/screen interface means, again for example by directing movement of a cursor by keyboard keys or mouse operation, and clicking, and so on.

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In each case the software forming the simulation means on the present example will run a simulated version of the service to be provided at the corresponding functions selected by the user. This will enable the user to gauge whether his intended selection of options will in fact provide a service of appearance or content sufficient to meet his requirements.

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It is noted that other simulation means other than software are possible, such as electronic circuits.

15 In the present embodiment, a further feature can be that, after selection by the user, a sample service corresponding to the selection is provided to the user for a limited duration. When the user has made a selection of the options, the actual service is provided, but only for a limited duration. Thus a means is provided for the user to gauge whether his intended selection of  
20 options will in fact provide a service of appearance or content sufficient to meet his requirements. This would also facilitate advantageous commercial choices for the content provider such as whether the service of limited duration is to be provided free of cost or at reduced cost. Also, the limited duration can consist of either a predetermined period of time or a  
25 predetermined cost, or some combination of these or other features that the skilled person would choose according to the particular system requirements. After the limited duration has expired, the user could request service to be continued or alternatively could select a different combination of options.

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The above described features of simulation means and sample service may be provided by the content provider in the alternate, or also they could both be provided.

- 5 As described above, in the present embodiment, user station 110 consists of a mobile telephone 310 comprising means for communicating over a communication link 320 with an external device 330. However, alternatively, user station can consist of an electronic organiser module/mobile radio telephone combination unit, including a display and  
10 keyboard. Alternatively, the user station can be in effective mobile form by being constituted of a pci card plugged into a computer and serving as a radio modem. Similarly, a further alternative is a portable computer with a radio built in. Yet another alternative is a mobile telephone unit in which the user actions corresponding to those described earlier above are carried  
15 out by voice activation and/or key stroke methods.

The present invention allows the provision of a facility wherein the user can select a maximum price he wishes to pay, and a choice of parameter value options within that price can be presented to the user.

- 20 The present invention provides advantages in any applicable communication system, but is however particularly advantageous in network arrangements including cellular radio communication systems, such as UMTS, since the inclusion of a radio link, and the impact of  
25 cellular arrangement, means the different values of communications parameters available are particularly marked and are likely to be particularly price sensitive. The present invention is similarly particularly advantageous in any communication systems with "bandwidth on demand" or similar characteristic. Also, in the case of mobile stations, the  
30 mobility aspect itself will mean that a given customer may be prepared to pay more or less, or require different level of service, dependent on his location at a particular time.

The present invention is also particularly advantageous in situations where large price variations apply to the parameter values but such parameter values are not important for certain applications. One such application would be telemetry where slow data transfer or large delay might not represent much of a problem.

A further advantage can be provided whereby the content provider can choose end limits, or limitations of allowable combinations, of the values that the user is permitted to choose. This may be done in order to maintain bottom line levels of quality, for the purposes of maintaining customer perception or expectations.